

Multiple broods from a hole in the wall: breeding Red-and-yellow Barbets *Trachyphonus erythrocephalus* in southeast Sudan

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Summary

Nesting and breeding behaviour of Red-and-yellow Barbets *Trachyphonus erythrocephalus* was recorded from a nest in the brick stone-wall of a house in Nanyangacor, south-eastern Sudan in 2005. There were at least five breeding attempts throughout the year, with at least four broods from this single nesting hole. The mean number of days in between broods was 27, and breeding did not appear to be directly related to rainfall.

Introduction

Barbets are known to breed throughout the year depending on their locality (Del Hoyo *et al.* 2002). In the temperate zone of southern Africa, breeding is seasonal and is limited to September–February, whereas in other areas, breeding can be opportunistic and year-round depending on rainfall. The Red-fronted Barbet *Tricholaema diademata*, for instance, is known to breed in virtually every month of the year (Del Hoyo *et al.* 2002). Similarly, the Crested Barbet *Trachyphonus vaillantii* from southern Africa can have up to four broods per year, whereas Yellow-breasted Barbet *T. margaritatus* of the Sahelian zone may have two broods. However, little is known of the multiple brooding behaviour of the Red-and-yellow Barbet *Trachyphonus erythrocephalus*.

From 19 January 2004 until 5 January 2006, I lived in Nanyangacor (05°30'N 34°46'E), Kauto Payam, south-east Sudan very near the Ethiopian border. I observed Red-and-yellow Barbets in the vicinity of our house (Fig. 1). They were commonly observed throughout my two-year stay in this house, and were found to be a common breeding bird in the wider area (de Bont, 2009). Though I observed possible breeding in the wall of my house (inset, Fig. 1) from the outset, it was only on 6 March 2004 that I noted sounds of birds in the nest hole, and not until February of the following year that I first recorded breeding inside the wall.



Figure 1. My house and the immediate surroundings. Inset: the nest hole and one of the breeding adults.

Methods

The area around Nanyangacor is semi-arid, largely falling within the Somali-Masai biome, but including some parts of the Sudan-Guinea Savannah, Afro-tropical Highland, Sahara-Sindian and Sahel biomes; it is partly degraded due to growing human pressure and overgrazing (de Bont 2009). The landscape consists of dry river beds bordered with dense vegetation and rocky hillsides. The vegetation is dominated by various *Acacia* species, as well as the Toothbrush Tree (*Salvadora persica*).

Nikolaus (1987, 1989) stated that breeding of the Red-and-yellow Barbet in the Sudan commenced in May and June. According to Fry *et al.* (1988), laying dates in north-west Kenya are April-May (during the rains), and between December and June in south to south-west Kenya and north to northeast Tanzania. Fry *et al.* (1988) also states that this species 'double-brooded in captivity'. Reference material suggests that breeding could occur in any month within the entire distribution range of this species (Fry *et al.* 1988, Del Hoyo *et al.* 2002).

I recorded breeding activity opportunistically throughout 2005 for a total of 248 days. Observation periods were typically short. I kept nest records by listening for the presence of nestlings through the wall. I recorded the fledgling date as the day when nestlings could no longer be heard in the nest. Adults were occasionally filmed or photographed around the nest or when entering the nest hole with food for the young. Rainfall was measured daily using a standard rain gauge placed within the compound.

Results

Nest description

The nesting hole was unusual since it was situated in the stone wall of our small house. The house was in a compound with four other buildings: two

houses, a small chapel and a small garage. Adjacent to the nest site were several trees and bushes, amongst them a Toothbrush Tree growing on a low termite mound. The walls of the house were built of clay bricks with a cement spray on the exterior. The walls consisted of two layers with a mud layer in between.

The nest entrance was about 1.5 m above the ground; it was about 5 cm wide and 6 cm high. Depth was not measured to avoid excessive disturbance, but the nest was lined with leaves. It is likely that it took a long time to create this nest hole, because at the beginning of 2005, the birds were slowly making another hole less than 1 m from the first one, which never got finished before we left in January 2006.

Pair-group composition

In the vicinity of the breeding site several other Red-and-yellow Barbet groups were present. The nearest group was 500-600 m away, close to the mostly dry riverbed of the Nanyangacor River. There were several other groups along the same river with nests dug either in the steep riverbanks or on the nearby hill.

Because the birds were not ringed, it was difficult to recognise individual birds. This limits the ability to be more definite about the size of the group, especially whether it was a single pair or a larger group, albeit there were rarely more than two adults at a time around the nest. It was unlikely that other pairs would have used the same nest hole, since barbets are generally very aggressive and defend their feeding and breeding territories against conspecifics as well as other species (Del Hoyo *et al.* 2002).

Breeding records

There were five distinct instances of breeding activity at this hole in 2005 (Table 1), but it was not possible to ascertain whether it was always the exact same pair breeding.

Table 1. Breeding activity of Red-and-yellow Barbets from a single nest in south-eastern Sudan in 2005.

Date	Brood No.	Nesting activity	Fledging date	No. of Fledglings	Observed post-fledging
11 Feb	1	feeding young	unknown	unknown	no
25 Apr	2	young heard	17 May	unknown	yes
1 Jul	3	nest building	unknown	unknown	no
11 Sep	4	young heard	4 Oct	unknown	no
19 Nov	5	young seen	unknown	unknown	no

Rainfall data

Rainfall in 2005 was less than the mean annual rainfall measured from March 2000 – December 2005. Rainfall in 2005 was 641 mm compared to an annual mean of 738 mm. Despite this, local conditions were wet in March-May,

August and September (Fig. 2).

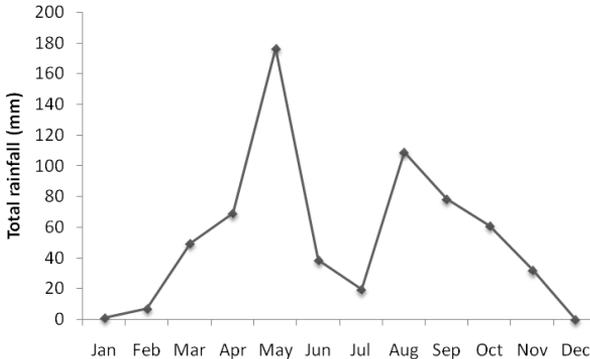


Figure 2. Total monthly rainfall during 2005 in Nanyangacor, SE Sudan

Discussion

Besides Fry *et al.* (1988) who mentions breeding of *T. margaritatus* in mud walls of buildings, the only other literature I found with breeding behaviour of *T. erythrocephalus* mentioned nesting in termite mounds or earthen banks.

The nestling period of the Red-and-yellow Barbet is 'unknown', whereas that of the Crested Barbet is given as '17-30 or more days' (Del Hoyo *et al.* 2002). From my notes I estimated a nestling period of 23 days for the second brood (young hatched on 25 April 2005 and fledged on 17 May 2005), and 24 days for the fourth brood (hatching: 11 September 2005; fledging: 04 October 2005).

In terms of clutch size, Fry *et al.* (1988) say that a clutch is 'usually 4-5', whilst Del Hoyo *et al.* (2002) states 2-6. Del Hoyo *et al.* also mention that the Crested Barbet lays eggs at a daily interval and I presume this would also hold for the Red-and-yellow Barbet. A calculation using these clutch numbers and eggs laid at a daily interval shows that the breeding period of the second nest was 45 days, and that of the fourth nest was 46 days. The Nashville Zoo has reported the breeding period for this species in captivity as 35-40 days (Nashville Zoo 2008).

It is noteworthy that the period between the 4th and 5th broods was only 23 days: the young of the 5th brood hatched on 19 November 2009. If one subtracts about 17 days of incubation, then minus 5 days laying eggs (assuming a clutch of five), gives 28 October 2009 as the approximate date for initiation of this clutch. This is barely four weeks from the fledging date of the fourth brood, suggesting that this could have been a different pair breeding in the same nest, or if it was the same pair, that either the young became rapidly independent, or had suffered mortality.

Calculating back from the definite breeding indications found in various months, there was some breeding activity in almost every month of 2005. Considering that I estimated an average breeding period of 46 days (per brood), calculating back shows that the first brood was initiated around 20 January 2005. There was no rain in this period (Fig. 2). In fact, there was only

8 mm of rain in the first two months of 2005 and another 67 mm in December 2004. The back-calculated date for the second brood is a full week after the four days of rain in the last week of March. The third brood begun around 16 June 2005, which was nearly two weeks after the heavy rains during the last week of May. The fourth brood was in a period of good rains in August, while the fifth brood of the year was started around a period of rainfall during the whole second half of October 2005. Albeit based on breeding activity at a single nest only, this may suggest that breeding was not as tied to rainfall in this area, as has been mentioned in previous publications (Nikolaus 1987, 1989, Fry *et al.* 1988, Del Hoyo *et al.* 2002).

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